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EDITORIALS

Intelligent Expenditure

THE new plan of the Alumni Research Association of the University of Wisconsin, described in the news section of this issue of THE CHEMIST, is probably the most productive and useful way of taking care of unemployed chemists of known ability. A grant of $10,000 has been made by the association to finance research in pure science; and the men chosen to do the work are Ph.D.'s from Wisconsin who have been unable to find satisfactory employment.

Might not a campaign to persuade other college alumni associations to finance research be more productive of relief funds than a campaign which suggests simply that unemployed chemists be given research jobs? The chemistry faculty at any university with a large graduate department knows men whose ability and even whose past research history is a matter of department record. Research done in these laboratories, by men already acclimated, is more apt to produce scientific discoveries than is sprinkling the college laboratories of the country with men chosen at random (or even in an attempt at selective choosing) from the lists of any of the technical relief committees.

There is always a tendency to believe that an unemployed man lacks ability. Every chemist can quote from his own knowledge a dozen cases where he knows that this is not true; but a man appealed to for funds does not need much argument to persuade himself not to contribute. An alumnus is constantly receiving appeals from his college, and has developed a certain resistance; but in these days of questioning the wisdom of further expansion of higher education, a program of scientific research would at least be more attractive than a drive for a new chapel.

At Wisconsin the idea seems to appeal to the alumni; and we shall await with interest publications describing productive work carried out at Madison.

High-class Men

IN ITS attempt to find jobs for chemists, the Breyer Committee is handicapped by the feeling in some companies that unemployed chemists are in many cases unemployables. It is true that readjustments in industry will force many chemists to leave the profession; but

it is not at all certain that the chemists who ought to leave chemistry are the present unemployed. Employers will do well to look over the field and see what improvements they can make in their staffs.

There has recently come to our attention a specific example of a company which profited by a wise policy of keeping its eyes open. XYZ Chemicals, Inc., have an unusually forward-looking chief chemist, a man who thinks of the company's good even at the risk of being temporarily unpopular with the company directors. To this chief chemist there came a few months ago a young chemist in great financial distress—a man of good training and ability, with a family and no money. The chief chemist, already over his budget, risked incurring directorial displeasure and went over his allowance still further in order to hire the needy applicant.

The new man proved his worth so conclusively that the company executives agreed recently to a suggestion that his salary be increased by $100 a month. In these days an increase of $100 a month means that a man has very definitely shown that he is a money-maker for his employer. A narrow policy of low-rating all chemists who are in financial distress would have deprived this company of a valuable acquisition; and the companies that follow XYZ's example are the companies whose stocks are likely to be leaders in the market ten years from now.

THE CHEMIST

In order to keep the Institute in a sound financial position, THE CHEMIST has been reduced to forty pages; and it will probably remain at this size for the rest of the fiscal year. At the beginning of next year it may be possible to devise a budget which will permit a magazine more in keeping with the present expansion in the Institute itself.

Like all organizations the Institute finds that a reduction in income is hampering its efficiency. Like very few organizations, the Institute is growing in spite of conditions. We only regret that we cannot do now all the things we should like to do. Among other things, a number of interesting comments on the proposed classified index of American chemists are ready for publication. If the present growth is any indication, it is only a matter of time until the Institute accomplishes its aims.

When Prosperity Returns

By W. J. Baëza

A suggestion for industrial planning. Why have chemists lagged behind the engineer? Keeping society at its peak of production.

CHEMISTS were ill prepared and unorganized to combat the industrial catastrophe which overturned the economic stability of all nations and brought distress to all groups. The engineers were much quicker to bring their resources to help their profession. They advised political and financial authorities and joined in the welfare work which became almost at once of incomparable importance. Will the chemists be better prepared when prosperity returns? The basis of prosperity is a high consumption of goods. There is always a need for goods in excess of the supply; but the money to make the need an effective demand depends on wages earned and numbers employed.

History teaches that employment reaches serious climaxes periodically. Economists offer various explanations, but there is one self-evident. When production exceeds purchase power, goods fail to move, producers decrease normal activity, pay-rolls contract, and purchase power thus further decreases. Depression grows like an avalanche. It continues and must continue until the increasing excess supply has been consumed. Then at last the demand for goods increases, production grows, more men are employed, and purchase power multiplies with multiplying employment. These are the basic causes which produce the cycles of distress and prosperity. It is well to note them in times of depression, for we are quick to forget and even deny them in boom times. Witness the volumes written to prove the end of economic cycles; that good times had come to stay. Some of them are dated as late as 1929.

Such cycles are inherent in our economic system; but that does not imply they are inevitable. Intelligent planning must take the place of *laissez faire*. In times of prosperity projects will be planned and financed by federal and state government. These projects will be of such a nature that their immediate fulfillment can be delayed indefinitely—can be stopped in process and resumed at will. The necessary government work will continue as usual, but there will always be a reserve of government enterprise, financed when money is readily available, which can be called into prompt operation whenever unemployment threatens to reduce consuming power. If government industry will take up the slack periodically attacking private enterprise, depression can be stopped ere born. The government will plan to be in position to employ labor when there is an excess. When the demand for workers in private industry rises, the government will stop the "depression insurance" projects and allow the normal law of supply and demand to govern wages. Government projects will act in balance with private industry, becoming active when private industry lags. They will thus maintain employment and purchase power.

LET us examine a typical community before and after this plan is in operation. The community Z is a small self-sustaining state, engaged in all the industrial activities essential to the life of the community, importing a few brick and exporting a little glass. It is prosperous. It's weekly pay-roll is about a million dollars. A new machine is introduced into its glass industry. Technological unemployment begins, and the pay-roll of the community drops to $900,000. That is not serious, but there is a distinct drop in purchasing power, and some stores find need for fewer sales-people and reduce the total pay-roll further. A few automobile manufacturers find their sale of cars is lower and decrease production, lay off men, and further reduce the total pay-roll. Fewer radios are sold, and more men are out of work. The community begins to economize; its purchasing power has been seriously affected. A family here and there stops taking cream and the extra bottle of milk. It buys a couple of loaves of bread less each week, and the farmer's income is reduced. Bank deposits decrease, and the bankers raise interest rates on loans and tighten credit. Since we have all been in our own depression so long, the tragedy of Z need not be enlarged upon. Let us turn to the brighter picture of what happens under planned control.

When the statistical bureau of Z reports the pay-roll of the community has dropped to $900,000, the government project goes into

operation. In as short time as it has fallen, it is back to the normal level. With the pay-roll maintained, there is no drop in purchasing power, and no further unemployment. Furthermore, the demand for goods for the project has stimulated production, and the government pay-roll need not take up the entire burden created by the technological improvements in the glass industry. In time this improvement brings wealth into the community. The total purchasing power increases, there is a general stimulus to employment, and private enterprise finds labor costs getting excessive. Before this becomes an abuse the government project is stopped, and the pay-roll which had increased drops back to normal.

It is obvious that several highly specialized glass operatives are not helped by this plan. Their incomes will be reduced as they become novice insurance salesmen, or mix concrete for the government project. The plan will not convert Z into Utopia. But glass-workers will be infinitely better off than under our present *laissez faire* policy, for they will not be competing for work with these who have become unemployed through unemployment in the glass industry and the drop in purchasing power. There will be as many jobs as there were before the improvement in the glass industry, since the government will employ men on its project. Z will not face the tragedy of starving men unable to find work of any kind.

This idea is neither utopian nor a far off hope. It is permeating the mind of America today. It will be put in force the moment the nation is able to build reserves. And that moment can confidently be expected before we are again disturbed by presidential campaigning. Already steel is rusting faster than it is produced, and the power to replace it will be forthcoming, even if its only source must be speculative credit.

AS chemists, the kind and form of projects the government will hold in reserve is of vital interest to our welfare. These reserves will be taxed to stabilize industry and employment. Some of them should guarantee employment to chemists. We have been taught to think of the state undertaking public works, in terms of engineering. Why? Because the engineers are strongly organized and closely knit into the political structure of the country. All honor to them. They have defined the needs of the nation in engineering projects. At a moment's notice they can lay before state or federal board plans for a great number of public works which require their skill and ability . . . and that will employ thousands of engineers.

Where are the chemists? Is there any representative group of chemists which can lay before the government a proposal which will be considered a project of public welfare? Is there any group which knows whom to approach, or how? Are chemical activities of value only to private enterprise? Is there no public value in chemical work?

There are intellects among our fellows that can plan chemical projects, that can demonstrate their public value and prove they properly should be undertaken by the state. Agricultural problems, potable water problems, and the development of natural resources are either closely allied or entirely within the field of chemical endeavor. Sanitation, waste disposal, and a host of other fields are of public import and are chemical projects.

When the government plans its reserve industry to take up the slack in private employment, it will plan work to keep the engineers busy and their economic status high. Are we (and "we" means The American Institute of Chemists, for only we are pledged to guard professional welfare), are we going to keep the chemist employed, or resort again to such pitiful help as can be afforded through relief agencies? Let us begin now and at once to insure the chemist against unemployment in the future. We have the intellectual ability. We have The American Institute of Chemists. Let us start the chemists of America thinking and working now. Let us be competently prepared . . . when prosperity returns.

Inventor of Methods

By A. P. Sachs

Friedrich Wilhelm Ostwald (Riga, Sept. 2, 1853—Gross-Bothen, Saxony, April 4, 1932). A chemist whose chief interest was scientific method. Great plans that were wrecked by the war.

IT is the custom of professional biographers today to debunk their heroes, to belittle them, to remove the glamor and glory of their lives, just as it seems to have been the undeviating custom of previous biographers to set their heroes on marble pedestals, to make every general an Alexander, every poet a Homer, every explorer a Marco Polo.

Fortunately for us, the life and achievement of Ostwald can be more fairly and justly appraised, to the degree that any great man's life can be appraised at all. There is no great legend to maintain, no great mystical success to revaluate and devaluate. There is merely the noble figure in simple outline of a man of action, blessed with numerous talents, who carved for himself an enduring place in the annals of science. Lesser men have lived through the ages in the memory of mankind; greater men have been few indeed.

He was a great experimenter, a great generalizer, an inspiring teacher, a wonderful organizer, a philosopher, an internationalist, the prophet of a new day, an artist, a veritable Leonardo da Vinci of science in the versatility and the magnitude of his talents; or perhaps a Goethe of science, for Goethe was his great ideal.

He lived a life of labor, of labor in the sense of utilizing the stream of creative energy which flowed irresistibly from him. His motto for life was:

"Vergeude keine energie, werwerfe sie." (Do not squander energy, but sow it.)

His so-called energetic imperative teaches that of the excess stream of crude energy available to human life the maximum should be converted to the forms which raise the level of human culture.

P. Walden, to whom we are indebted for a biography of Ostwald written in 1904 and for a recent appreciative and understanding obituary of Ostwald for *Berichte der deutschen chemischen Gesellschaft*, said of

him: "He did not hesitate to do kindnesses and to share, and like a miraculous tree he gave forth lavishly much shelter, support, fruit, and nourishment."

BORN at Riga, now in Latvia, then part of the Baltic Provinces of Russia, a city never Russianized but essentially Teutonic in spirit, this second child of a cooper was interested in his high school days in chemistry, music, photography, painting, etc., and carried on home experimentation.

As a university student he thought he had developed an original indigo synthesis, which he sent to Ad. Baeyer for criticism; and with this failure in the realm of organic synthesis the game of synthesizing new organic compounds, then and now so popular, passed completely out of his life.

He went to the University of Dorpat in 1872 to study chemistry. He has described the student life there as "alcoholic," but it seems not to have damaged him, for in 1875, before he was 22, he published his first paper on the chemical mass action of water. He was made assistant first in physics and later in chemistry, and he obtained his doctorate in 1878. Although he had declared he would never marry because he pitied his wife in advance, he married Helene v. Reyher in 1880 because she was "interfering" with his work.

In 1881 after several preferred candidates had turned down the offer, young Ostwald accepted a professorship at Riga. At Riga, and later at Leipzig, he proved himself a great experimenter, a great and inspiring teacher, a great organizer, a talented literary man, and a truly great critic, appreciator, and evaluator of the work of others. It may be said that he made no great fundamental discovery himself and yet he was in more ways than one the father of physical chemistry.

His early work was on chemical affinities (1879–85). He studied the solution in acids of various salts insoluble in water and in so doing discovered the neutral salt effect of which so much has been heard since. His studies of chemical dynamics (1883–88) related time, temperature, and concentration to reaction velocity. Lothar Meyer in his classical text on "Modern Theories of Chemistry" utilized Ostwald's results in detail. The organic chemist, H. Kolbe, not only published Ostwald's papers in his *Journal für Praktische Chemie* but encouraged him to write a "Textbook of General Chemistry." On the other hand, A. v. Kekulé in 1883 advised Ostwald to give up his physico-chemical investigations as fruitless.

ARRHENIUS'S doctoral dissertation, "Researches on the Conductivity of Electrolytes," appeared in 1884. Ostwald saw the connection between Arrhenius's ideas (the relation of acid strength to electrical conductivity) and his own "chemical affinities" and immediately built suitable conductivity measuring instruments and measured numerous conductivities the very same year. His keen insight appreciated the importance of Arrhenius's work.

Ostwald's papers on electrochemical studies appeared in rapid succession; the second (1885) enunciated his famous dilution law for electrolytes. He devised numerous instruments which were immediately widely adopted.

In 1887 he established the *Zeitschrift für Physikalische Chemie* with J. H. van't Hoff as co-editor and with contributing editors in Germany, Russia, France, England, Scandinavia, and Italy. A hundred and sixty volumes have appeared; and since 1928 it has been divided into two sections, the newer, B, being devoted to "Chemistry of the Elementary Processes—Structure of Matter." He remained editor until 1922 and in the 100th volume said farewell as editor and contributor with an article on the history of his famous journal.

He wrote abstracts and book reviews for his journal; and Walden has counted 3880 abstracts and 890 book reviews written by Ostwald in the period 1887–1903.

In 1887, at the age of 34, he was called to Leipzig to accept the professorship of physical chemistry refused by van't Hoff, Landolt, and Winkler. He arranged new laboratories, laid out new courses, and constructed the necessary equipment of measuring instruments. His first assistant was Nernst and later Arrhenius Among his co-workers and assistants were Tammann, LeBlanc, Luther, Bodenstein, Bredig, Drucker, and Freundlich.

In the period 1887–1906 he did an enormous amount of work, particularly in advancing the teaching of physical chemistry, training teachers, and conducting studies in chemical equilibrium and catalysis. In this period 60 to 70 students went forth from Leipzig to become professors in institutions of higher learning throughout the world. The papers from his department of physical chemistry from 1887–96 alone filled four volumes. They related to the osmotic and electrolytic theories of solution, and the quality was extremely high. Although he inspired and directed all the work, he saw to it that the credit and the honor went to the young investigators.

Numerous books were called forth by his experimental and teaching work. "The Foundations of General Chemistry" in 1889 (7th edition,

1923); "Manual of Physico-Chemical Measurement" in 1893 (5th edition, 1930); the revolutionary "Scientific Foundations of Analytical Chemistry" in 1894 (7th edition, 1920), which was translated into seven languages; the "Foundations of Inorganic Chemistry" in 1900 (5th edition, 1922); a translation of Willard Gibbs's Thermodynamic Studies" in 1892; "History and Science of Electrochemistry" in 1894–96.

He founded the "Classics of the Exact Sciences" in 1889 to provide students and investigators with the source materials of scientific knowledge. The first classic was "The Conservation of Energy" by Helmholtz, with notes by Ostwald. He provided the impetus and the pattern for the succeeding 232 issues. (No. 233 issued in 1932.) He brought to the attention of his generation many of the neglected great of an earlier generation: Hittorf, Hess, Wilhelmy, Scheele, Gay-Lussac, etc.

In 1907 he wrote "Principles of Chemistry—An Introduction to All Chemical Textbooks;" in 1910 his "Introduction to Chemistry" (3rd edition 1922) appeared. He issued his "School of Chemistry" in two parts in 1903–4 (4th edition 1919) as a first introduction to chemistry for every one. His "Chemical Literature and the Organization of Science" (1919) had sections devoted to reporting new results of research, establishment of scientific units, textbooks, chemical systems, the technique of organization, and a summary of his experience as author, teacher, and investigator. In all his writings Ostwald was a master of style and concept.

In 1904 he received an honorary degree at Cambridge and was later honored by German, Swiss, English, and American Universities.

ALTHOUGH physical chemistry, by whatever name it was known, was already a well-founded science (Berthelot had extended the principle of conservation of energy to chemical reactions and had deduced therefrom the full logical consequences; Ste-Claire-Deville had established the reversibility of chemical reactions; and these with Gibbs, Le Chatelier, Duhem, and van't Hoff had applied the principle of Carnot to these reactions and had theoretically established the equilibrium formulae; Raoult was already collecting the data which were to confirm the new theories), yet 1887 may be looked upon as the great year of classical physical chemistry. The fundamental concept was being enunciated that dilute solutions are completely analogous to gases. Van't Hoff developed the concept of the rôle of osmotic pressure in the analogy between solutions and gases, while Planck arrived independently by thermodynamic reasoning at the same conclusion. Arrhenius showed the agreement between ionization as de-

termined by electrolytic conductivity and by depression of the freezing point. All these papers appeared in the first volume (for 1887) of the new *Zeitschrift für Physikalische Chemie.*

Ostwald as proponent of these new ideas carried out extensive experimental work, developed new concepts and generalizations and within a decade firmly established these concepts as a permanent part of the structure of physics and chemistry. He derived his dilution law and tested five carboxylic acids, making the necessary corrections for volume of solute and viscosity of solution. Planck again independently confirmed Ostwald's conclusions theoretically, and van't Hoff and Reicher confirmed his conclusions experimentally.

In 1889 Ostwald set forth salt formation by neutralization as essentially the formation of water, and the heat of neutralization as essentially the heat of formation of water from its ions. In 1891 he showed by spectrographic examination of dilute solutions of colored salts possessing a common colored ion that the salts are practically completely ionized and their properties additive. He showed the stepwise mode of dissociation of polybasic acids. In 1893 Ostwald worked out two methods for determining the degree of ionization of pure water itself.

In 1891 Ostwald evolved the concept of autocatalysis to describe the transformation of maleic acid into fumaric acid. He was the first to understand fully the nature of catalysis and to make a real advance over Berzelius's original conceptions. In 1894 he stated, "catalysis is the acceleration of a slow chemical reaction owing to the presence of a foreign substance," and in 1896 speaking of catalytic phenomena he says, "it is always a question of the time necessary for the reaction, not of rendering possible a reaction not otherwise possible." He pointed out the clear analogy of organic ferments to catalysts and established a clear, complete concept of catalysis which has ever since been a guiding beacon to chemistry—inorganic, organic, and biological. Ostwald considered his work on catalysis his greatest independent and most successful contribution to chemistry. He achieved an ammonia synthesis, but the subsequent industrialization was worked out by Haber-Bosch-Mittasch. Ostwald later oxidized ammonia to nitric acid. In 1909 he was awarded the Nobel Prize for his work in catalysis.

In 1893 he brought forth the concept of metastability. Pure liquid salol may be supercooled enormously, and nothing but a crystal will initiate crystallization. Supercooled salol is thus in a metastable state, while labile substances crystallize spontaneously. In 1897 Ostwald enunciated the general law that "in passing from one state to a

more stable one, the passage is not to the most stable under the new conditions but to that state involving the least change." If chlorine is passed into caustic potash, we do not obtain the most stable system, which is potassium chloride and oxygen, but the least stable, which is potassium chloride and potassium hypochlorite, which slowly transforms into the most stable state. This gives an insight into the mechanism of the reaction, the formation of intermediate products and the rule for stepwise reactions which has proved so powerful an instrument of research. This is related to Ostwald's rule derived from energy considerations that "all substances which under given conditions are possible in a homogeneous system do actually form, even if only in vanishingly small quantities."

The energy concept influenced Ostwald all his life. In his inaugural address at Leipzig in 1887 he declared energy to be the great reality and not a mere mathematical abstraction. Although his work in the field of energy, or rather Energetics, as he preferred to call it, is as imposing as his chemical work, we can scarcely even touch upon it here. He developed his energy concept into a scientifically homogeneous system including physiology, psychology, and sociology.

OSTWALD was a great student of history, of the philosophy of history and the evolution of history. His "Psychographic Studies" (1907) recognized the existence of certain regularities in the growth, creative-tempo, and maximum creativeness of distinguished investigators. His small book, "Inventors and Discoveries" (1908), was followed in 1909 by the great work, "Great Men: Studies in Biology of Genius." This led him naturally to investigate the school systems and quality of school training. In his book "Against Starving the Schools" (1909) he fought against the overvaluation of language teaching, against the unnecessary lengthening of the schooling period, and against the system of final examinations in the German colleges.

In 1908 he published "Energy" for a broader circle, with chapters on life, psychological phenomena, and sociological energetics. The last was more fully treated in his "Energetic Foundations of the Science of Civilization" (1910). The same year he published "Claims of the Times" which was followed in 1911 by "The Mill of Life: Physico-Chemical Foundations of the Phenomena of Life," and in 1912 by his comprehensive work "The Energetic Imperative."

It was but natural that Ostwald should attempt to develop a philosophy based on his concepts of energy and the data of science. His philosophy is a practical or applied science of energetics which has as

its object the cultivation of the relationships between the individual sciences and the nurture of philosophy as the science of the common ingredient of all the individual sciences. He felt that philosophy must take its raw material from the technical and observational sciences. He considered all the sciences as interwrought and as a true unit. The title of one of his last works, "The Pyramid of the Sciences" (1929), expresses his attitude concisely.

He devoted the years 1902–12 largely to the problems of philosophy. He founded and for fourteen years edited the *Annalen der Natur-Philosophie* (1901–14). He wrote "Addresses on Natural Philosophy" (1902), "The Foundations of Natural Philosophy" (1908), "A Decade of Natural Philosophy" (1911), "Modern Natural Philosophy" (1914), which was revised in 1923 as "The Organizing Science," "The Philosophy of Value" (1912), his momentous "Energetic Imperative" already mentioned and "The Great Elixir" (1920).

The history of science had great importance in his concept of the evolution of the sciences. His "Electrochemistry: History and Science" (1896), his "History of the Study of Contact Actions" (1898), his "Progress of a Science—Seven Addresses on the History of Chemistry" (revised edition, 1908), and various other texts and monographs have a historico-evolutionary viewpoint.

Ostwald wrote numerous biographies and obituaries of his famous predecessors and contemporaries, among them Dalton, Davy, Faraday, Bunsen, Mitscherlich, Wislicenus, van't Hoff, and Arrhenius, always in his vivid style, always with keen critical appreciation. Last but not least of his biographical works was his great autobiography in 3 volumes (1926–27), called "Paths of Life: An Autobiography." It is not only a history of himself but of his times in many lands, his native Baltic Province, Sweden, England, Germany, Austria, and even America, which he visited three times on lecture and teaching trips.

OSTWALD was a great organizer of men, institutions, and knowledge. We need only mention his "Textbook of General Chemistry." This was no mere rewriting of his predecessors' texts, but a new organization of existing knowledge. His work in organizing the chemistry department at Leipzig and his development of the school of physical chemistry there was an achievement which has left a permanent impress on the chemistry of the world through the professors in every country who studied there. When Ostwald retired from Leipzig in 1906 it was but natural that he should continue his organizing work in new fields.

But to go back. He helped establish the German Electrochemical Society (now the German Bunsen Society for Applied Physical Chemistry) and was its first president. In 1899 he was made an honorary member.

Ostwald proposed the creation of a great chemical institute in Germany with able investigators free from the routine of teaching, and in a pamphlet (1906) called "The National Bureau of Chemistry" he set forth his plans. His work in this direction was not fairly appraised, and he was allotted so minor a share in its development that he withdrew in pique. Yet his plans bore fruit in the foundation in 1910 of the great Kaiser-Wilhelm-Institut which has since then developed great scientific sections devoted to physical chemistry, electrochemistry, biochemistry, etc.

Bühler and Saager in 1911 proposed the establishment of a new form of activity to correlate various technical activities. Ostwald became first president of this society, The Bridge, in 1911 and gave his Nobel prize money to it as an endowment. Among the results of this work were the standardization of paper-format for technical journals, the division of technical journals into sections suitable for removing and reassembling, and the classification and naming of colors. These ideas of Ostwald gained a foothold in industry as limited types and normal standards. It is tragic to consider that the fate of Ostwald's ideas was the neglect of their founder and the distortion of his ideas so that he resigned in 1912.

ANOTHER of his important tasks was in connection with the International Atomic Weights Commission. In his "Textbook of General Chemistry" (1885) he set oxygen = 16 owing to the confusion resulting from using hydrogen = 1. In 1897 a commission including Ostwald proposed O = 16 for Germany, and in 1900 an international commission made the same recommendation. Yet the committee of three (Clarke, Thorpe, Seibert) of the International Atomic Weight Commission in 1903 issued two tables, one based on O = 16 and the other on H = 1. In 1906 O = 16 was accepted as the permanent single standard. From 1906–16 he was on the commission each year, and when the war interrupted this international work, Ostwald alone published atomic weights annually (for Germany) until 1932, when the International Commission was finally reconstituted.

In 1911, after preliminaries between Ostwald and Haller at Paris, three representatives each from England, France, and Germany (including Ostwald) met and established the International Association

of Chemical Societies. The second meeting was held in 1912 at Berlin, with Ostwald as presiding officer. Most countries joined, and a program for the internationalization of chemical nomenclature, for the establishment of an artificial international chemical language, and for standard format for journals was initiated. Ostwald planned the formation of an International Institute of Chemistry in connection with the Association, and in 1913 Solvay offered an endowment fund for such an Institute, the details to be fixed in 1914. The wreckage of this magnificent plan by the war was a cruel blow to Ostwald.

Haeckel in 1906 had founded the Union of Monists, and in 1910 he induced Ostwald to take over the guidance of the Union. Ostwald displayed his usual organizational powers in developing and spreading the modern scientific gospel of world phenomena in place of the antiquated religions. At the great meeting of the Monists in 1911 at Hamburg an international association was founded and the monistic (*i. e.*, scientific) century was declared to be with us. Ostwald stated his ideas in "Monistic Sermons" (from 1911, published in 3 volumes in 1913) in the form of essays on ethical and religious problems. He also issued in 1914 a pamphlet on the works of Monism and polemics of Monism against academic philosophy, traditional religion, etc. But he lost his enthusiasm owing to internal friction, and that and the war made him give up his leadership in 1914.

TEACHING so many foreigners, visiting so many international congresses, the increasing number of permissive languages at such meetings, and the natural hindrances to understanding and discussing the papers and problems at these meetings, and the numerous invitations he received to make addresses abroad, made Ostwald feel how much energy was being squandered and how much of the life of the investigator was hampered and wasted in learning foreign languages and in using them. As exchange professor to the U. S. A. in 1905–6 he began his propaganda for Esperanto, and on his return home he established prizes for the best translations. A meeting of a committee for an auxiliary language was called at Paris in 1907, Ostwald was elected chairman, and a new language, Ido, was created with its own newspaper, *Progresso*. The future of Ido seemed assured, especially when arrangements were initiated for the formation of an office for world languages at Berne. In a paper on "Chemical World Literature" Ostwald established the foundation in Ido for an international chemical nomenclature. Natural inertia made progress slow, and the war swept internationalism from even scientists' minds.

As the founder of energetics, as an idealist, as an internationalist, Ostwald considered war as the most vicious form of energy waste. He was an active pacifist, and at the peace congresses of 1909–11 (Vienna, Stockholm, Frankfurt), he read papers. In a French monthly he wrote an article on "The Great Step," which was voluntary disarmament. He was a little premature. The Great War was soon to come.

In all his organizational work Ostwald showed courage and vision, energy and ability. The futility of much of his efforts is a criticism not of him, but of the world, for the world is now slowly returning to all his plans for international cooperation and the organization of knowledge.

During the war no use was made of his abilities, but his plant at Bochum for making nitric acid from ammonia was taken over by the state. At 61 he turned to the science of color and made perhaps his greatest contribution to human culture. Single-handed he investigated the theory of color, devised units for expressing measurements, invented instruments for making the measurements, provided standards wrote the texts, edited and wrote the journal, and until his death at 79 he bore the whole burden himself. He introduced the study of color harmony into German elementary schools and the measurement of color into German industry. Such is the force of tradition and the inertia of narrow nationalism that very little has been done with this last and greatest contribution of Ostwald outside of the German speaking countries.

IN 1924 at Gross-Bothen Ostwald told the writer that his great ambition was to make color sensation and harmony as much a part of the human capacity for joy as is music. He said that the shopgirl could be taught to understand the beauty visible to the eye as easily as beauty audible to the ear, and that such a cultural achievement would please him more than any merely scientific success.

His "Color Primer" (1916) reached its 14th edition in 1931; "Color Science" (I and II, 1918–19), a monumental work, its 3rd edition in 1931; the "Harmony of Colors" (1918), 5th edition, 1923; "Goethe, Schopenhauer, and Color Theory" (1918), 2nd edition, 1931; "Introduction to Color Theory" (1919); "School of Color" (1919), 5th edition, 1924; "Harmony of Forms" (1922); "The World of Forms" (1922–24); "The Science of Colors" (1923); "Atlas of Color Standards" (1924); "Color Scales," 2nd edition (1924); "Painting Technique" (1930); and from 1921 the periodical *Color*. His last work, 1932, was "Goethe the Prophet."

Ostwald stands a giant among chemists, a versatile mind in chemistry, physics, philosophy, art; a creator of great generalizations and the unfolder of new realms of science; an organizer of human effort; a vast fountain of creative energy; and a great prophet.

Ostwald and Gibbs

AN ADMIRABLE CRICHTON passed with Wilhelm Ostwald. Not content with the position that he won as a founder of physical chemistry—a science which treats chemical reactions as exchanges of energy—he ranged over the whole field of human knowledge. He painted excellent pictures in new media of his own contriving, dabbled in music, devised new methods of printing, invented Ido, a language intended to simplify Esperanto, founded "Die Brücke," an institute to lighten intellectual labor by standardizing books, periodicals, and other printed forms; studied the lives of great littérateurs and savants at the suggestion of a Japanese pupil of his, only to discover how cruelly and stupidly the world treats genius; inspired and led the Monist movement in Germany, and wound up as a philosopher in the grand eighteenth-century manner. There was no trace of dilettantism in this diversity of interest. Always there was a delving for facts ultimately synthesized into principles that could be practically applied. Energy as a manifestation of dead and living matter was his passion. He wrote books about it. When he died it was in his Villa Energie where he spent the last years of a rich and fruitful life.

Ostwald has an especial claim on American sympathy because he was one of the very first to recognize the genius of Willard Gibbs, the finest scientific mind we have yet produced. To perceive in the mathematical equations of Gibbs and in the highly condensed, obscure text that accompanied them conclusions destined to change the whole course of chemistry and even affect industrial processes implies something akin to clairvoyance on Ostwald's part. Patiently he translated Gibbs. It is one of the anomalies of scientific literature that for years an American chemist could study Gibbs only in Ostwald's German translation.

Such perception and such devotion to a conviction were characteristic of Ostwald. One likes to think that the Nobel Prize was awarded to him not only for his solid contributions to physical chemistry, but for his championing of Gibbs, of his friend Van't Hoff, of his pupil Arrhenius —of almost any man of science who had devised a revolutionary but valid theory and failed to receive his due.

—Editorial in THE NEW YORK TIMES

There Is No New Thing Under the Sun

By Charles H. LaWall and J. W. E. Harrisson

The ancient origins of some apparently new ideas. What antiquity knew about chemistry. From Solomon to the Congressional Library.

THUS saieth Ecclesiastes or the Preacher; and whether Solomon wrote the lines or whether they were the inspiration of some later author, as most commentators on the Bible believe, they certainly have been literally true from the beginning of recorded history as regards many of the formulas and procedures in a number of the arts, crafts, and professions.

Fakers and charlatans there were, of course, in all ages and in all climes; but in almost every era there stands out some great character who, if he were transported to our time without any linguistic or sartorial handicaps, would be able to adapt himself to present conditions and understand our modern scientific progress better than some of our contemporaneous brethren who belong in all of the successive and periodic "dark ages."

Hippocrates would require a few weeks time to orient himself as regards the modern materia medica. He would probably engage in a controversy with the Council of Pharmacy and Chemistry of the A. M. A. before the second moon had set upon his reincarnation—and—Hippocrates might be right.

Galen would have to unlearn a few axioms which he acquired from the Alexandrian School, which was one of the many that he attended; but Galen would become one of the successful medical practitioners within a year. He knew both his materia medica and human nature, and he would soon be entirely at home in our modern medical atmosphere, where he would take an active part in association work. He would frequently prescribe *pro re nata*, which in prescription Latin means "when the occasion requires," his originally devised and favorite preparation *ceratum ex aqua frigida subactum refrigerat* described in volume XI of his published works entitled *De Simplicium Medicamentorium Facultatibus*, which on going back to our lessons in connection with the Gallic wars of that eminent veteran who never sought a bonus,

Julius Caesar, means "concerning the properties of simple remedies;" and, would you believe it, we call this preparation of Galen's "cold cream" today.

If Scribonius Largus, the personal physician to the Emperor Claudius (the poor boob who occupied the emperorship of Rome from 41 to 54 A.D.) had written a prescription in the first century of the Christian era for his royal patron, the modern pharmacist might have to consult a few reference works and look up a few glossarys for the names of the drugs, but so far as the symbols and values for the ounce, the drachm, the scruple, and the grain are concerned, he could fill the prescription with perfect safety to the patient.

LET us skip a few hundred years and jump to the period of Geber or Javir or whatever you choose to call him, for he concealed his facts so well in the language of his original dissertations and of his translations, that when we cannot understand a statement we call it "gibberish." This was before the end of the first millennium of the Christian Era.

Well! we have our suspicions that Geber knew more than he told, and he told a lot at that. Besides occult and mysterious affairs he discussed compounds of tin, lead, copper, iron, gold, silver, and magnesia and while he talked learnedly about the seven properties of medicines and the mundification (whatever that is) of spirits—we suspect it has something to do with violations of the Volstead Act—and in his enumeration of valuable qualities and substances he discussed white medicines for Jupiter, red medicines for Venus and Mars, and of the "ablutions" and "incerations" of minerals and calxes, the fact remains that when we translate the essence of his work into our terms, we find that he first described sulphuric acid, nitric acid, nitrohydrochloric acid, corrosive sublimate, and silver nitrate.

Let us now jump or swim or fly a few hundred years further, and when we meet Roger Bacon we meet a real scientist. If you don't believe it, read the translation of the *Opus majus* published in 1928 by the University of Pennsylvania Press, and the "Cipher of Roger Bacon," by William Romaine Newbold (edited by R. G. Kent), published by the same authority. Here was a rare spirit who foresaw automobiles and submarines, bacteria and stellar galaxies, without batting an eyelash, even though he served a term in prison for his writings.

Then take Leonardo de Vinci, whose tragic motif was:

"Birds cry, Birds cry
Cranes fly, Eagles fly."

"There shall be wings for mankind;" or Benjamin Franklin, the brother of all the ages, whose many practical discoveries and suggestions place him on the highest pinnacle of fame among the unselfish inventors. He too would be perfectly at home in our times and would probably improve some of our modern inventions.

BUT where does this lead us? Shall we adopt the pessimistic view of the man who said he was not interested in anything that happened before the day before yesterday, and that "history is all the bunk!" Perhaps this same pessimistic individual is a manufacturer who is having trouble either with his product or his claims to priority of use of a certain formula. What does he know or care of the past? Or even his lawyer who is to protect his claims?

There are privately issued formularies and pharmacopoeias which contain recipes for many preparations which have been in acknowledged use for hundreds of years without question as to their efficacy or their originality. How many chemists who are consulted in patent suits involving priority or originality are aware of such works as the *Teatro Farmaceutico,* Donzelli, Rome, 1677; or *De Secreti del R.D. Alessio Piemontese,* Venice, 1659; or *Gli Ornamente delle Donne, Scritte per M. Giovanni Marinello,* Venice, 1574, or *Les Secrets et les Frandes de la Chymie et de la Pharmacie, Ala Haye,* 1759?

The modern chemist does not realize that a work entitled *Die Naturliche Magic,* J. C. Wieglieb, Berlin, 1789, is a work on the physics and chemistry of the time. The term magic was a variable: white magic was what we now call physics and chemistry, black magic was the manifestation of the occult or mysterious.

One of the most interesting and valuable works of the past, to the chemist who is looking for facts, is an early edition of "Appleton's Cyclopedia" published in 1728. Another is the "History of Inventions, Discoveries, and Origins" by John Beekman, London, of which there were a number of editions published. It covered a wide miscellaneous range including such diverse topics as artificial pearls, dyestuffs, secret poisons, Prince Rupert's drops, and falconry.

A prolific author of the early 19th century was John Ayrton Paris, whose "Pharmacologia" is a forerunner of the proceedings of the Council of Pharmacy and Chemistry, as far as his attitude toward the proprietary preparations of the day are concerned; and yet the most eminent historian of medicine, Fielding H. Garrison, does not even include

the name of Paris in the personal index. In marked contrast, Schelenz, the German historian of pharmacy, gives at least a dozen references to his works which were undoubtedly sincere and valuable.

ONE of the most important of the older contributors to our science was Frederick Accum. He started out by writing a book called "Chemical Amusement," of which the first London edition appeared in 1817, and the third American edition appeared in Philadelphia in 1818. This work contains detailed descriptions of 192 experiments which may be considered as fundamental in illustrating the principles of chemistry.

Another book of Accum's is called "A Treatise on Adulterations of Food and Culinary Poisons," of which the first edition was published in London in 1820. This is the celebrated work which emphasizes the wail of the Israelites, "There is death in the pot." In it is described in detail "the adulterations of bread, beer, wine, spirituous liquors, coffee, cream, confectionery, vinegar, mustard, pepper, cheese, olive oil, pickles, and other articles employed in domestic economy." The modern chemist will learn much of value by a perusal of the empiric methods described by this author.

Another interesting volume by the same writer is entitled "Culinary Chemistry," London, 1821. The illustrations and the text of this work are worthy of serious consideration by present-day experts in food chemistry.

But where, you say, can one find these ancient and valuable tomes? In the language of Milt Gross we can only reply, "Dunt esk." The only libraries in the United States in which such volumes can be found (if at all) are the Congressional Library in Washington, D.C.; the Lloyd Library in Cincinnati, Ohio; and a few of the libraries of the older colleges of pharmacy, such as those of Wisconsin at Madison; of Massachusetts at Boston; of New York at New York; and of Philadelphia.

Many of the volumes are only accessible through the assistance or the cooperation of those who have made a hobby of collecting ancient works on pharmacy and chemistry. But wherever they may chance to be found, the earnest seeker after truth will find much that is of value in them and will realize the truth of the quotation which was selected for the title of this article.

BY-PRODUCTS

Philosophy and Science. I

IT begins to be apparent that biology will furnish the battleground upon which science and philosophy will meet to thrash out their respective claims as interpreters of the universe. While we cannot recall any philosopher who denies to science full validity in the world of phenomena, there is no lack of scientists who deny the possibility of attaining truth by the methods of philosophy. When the issue is finally drawn, the philosophers will have the advantage that they know much more about science than the scientists know about philosophy. Most scientists are philosophers, but they are untrained and unsystematic in that field.

Modern biologists are divided into three camps: the mechanists, the vitalists, and those who try to dodge Scylla and duck Charybdis. Approaches to scientific interpretation so radically opposite as are exhibited by mechanists and vitalists are possible in no other scientific field that comes readily to mind, psychology being considered a branch of biology.

It seems to us that the situation really represents a curious misapprehension of the definitions of scientific method. Science, professing to describe processes in nature, must be mechanical in its methods and conclusions. For each process that may properly be made the object of scientific study, there must be a mechanical description. This involves only a statement of what actually occurs and does not enter into a consideration of the motives that bring about the phenomenon.

When the biologists begin to stray from the restricted scientific path and to consider living things as purposive agents, mechanism becomes inadequate, and the vitalists obtain an opening. Purpose is really a topic in the domain of philosophy. It implies the existence of an ideal goal toward the realization of which available energies are organized. The goal must be ideal, for it is non-existent as a realized condition; and the admission of the term "ideal" commits us to a philosophical position. It necessitates the recognition of the power of abstract thinking and the consciousness of ability to alter the course of events toward some defined end which has already been constructed in thought. All this is destructive of mechanism which cannot allow the slightest alteration in the necessary progress of cause and effect.

That living things exhibit behaviors which can most easily and simply be interpreted as purposive can be amply proved by reference to the pages of biological textbooks. Even there the out-and-out mechanist naïvely (and humorously) assumes purpose in describing the activities and functions of organisms even when, in words, he is most vigorously denying its existence.

But if we must fall back upon the idea of purpose adequately to describe the behavior of living things, we cannot avoid the problem of voluntary action which is involved. We are obligated to offer a logical account of such action at least insofar as it affects the behavior of animals. Our system cannot be complete so long as it ignores this implication.

But all this carries us into the field of systematic philosophy and requires specialized training in that discipline before we shall be competent to give the problems expert consideration. It forms, then, a division of science in which philosophy is considerably concerned; and it will furnish the battleground between these two great departments of human thought.

They Say

"Most beliefs about nature and man which were not founded on scientific observation have served directly or indirectly religious and social interests, and hence they have been protected by force against the criticisms of persons who have the inconvenient habit of using their reason. Nobody minds if his neighbor disbelieves a demonstrable fact. If a skeptic denies that Napoleon existed or that water is composed of oxygen and hydrogen, he causes amusement or ridicule. But if he denies doctrines that cannot be demonstrated, such as the existence of a personal God or the immortality of the soul, he incurs serious disapprobation and at one time he might have been put to death."—BURY, "Freedom of Thought."

—*The Autocratic Chemist*

BOOK REVIEW

Textile Research, a Survey of Progress. Compiled by the U. S. Institute for Textile Research. Published by Massachusetts Institute of Technology. Technology Press. $3.

The December issue of THE CHEMIST carried an account of the annual meeting of the U. S. Institute for Textile Research, Inc. The volume under review shows even more graphically than do the addresses at that meeting how great has been the need for such an Institute and how competently the need is being filled. The chapter headings illustrate the broad subdivisions of textile knowledge; and the authors of the separate chapters, each a specialist, supply excellent summaries of the knowledge in their fields.

As an instance worthy of special note we have the chapter on Chemical Analysis by our fellow-member, Dr. Joseph F. X. Harold. In the twenty-five pages of this chapter are covered all branches of the textile industry. Reference is made to 160 different publications on the subject.

As an example of thorough workmanship and as an invaluable reference work for the textile chemist or engineer, the book is highly recommended.

KARL M. HERSTEIN

OUR AUTHORS

Plan for the Future

Walter J. Baëza, F.A.I.C., is general manager of the Industrial Research Company, which develops new processes and solves industrial problems, especially problems in the paper and sugar industries. He spent about ten years in Central America, South America, and the West Indies as a development man and chief executive.

Mr. Baëza's favorite sports are fishing and clay-pigeon shooting, at which he says he is inexpert. He also likes long motor trips, and is a good tourist. His hobbies are bridge, detective stories, child education, social service, and Wall Street. His greatest aversion is walking; next comes talking with people of fixed opinions.

Tall, dark, of pronounced bridge theories, Mr. Baëza is usually to be found on Saturday afternoons in the games room of The Chemists' Club.

Historical Science

Charles H. LaWall, F.A.I.C., and **Joseph W. E. Harrisson,** F.A.I.C., are members of the consulting firm of LaWall & Harrisson, nationally known for its contributions to the knowledge and literature of pharmaceutical and food chemistry. Dr. LaWall was graduated from the Philadelphia College of Pharmacy and later received an honorary doctor's degree from the University of Pittsburgh. Mr. Harrisson was graduated from the Philadelphia College of Pharmacy.

Mr. Harrison has written a number of articles which have appeared in pharmaceutical publications; and he is a former department editor of the *American Druggist.* Dr. LaWall has had many papers published since 1895 in the *American Journal of Pharmacy* and in the *Journal of the American Pharmaceutical Association*; and he is co-author, with Dr. Leffmann, of *Organic Chemistry.* He is ex-president of the American Pharmaceutical Association and of the American Conference of Pharmaceutical Faculties.

Personal Reminiscences

Albert Parsons Sachs, F.A.I.C., writes of Wilhelm Ostwald with the sure touch of one who knew Ostwald personally. He describes their meeting as follows:

"I met Ostwald at his villa 'Energie' at Gross-Bothen, near Saxony, in 1924. He was then 71 years of age, vigorous, with a leonine head and bright eye. He was engaged in making incredibly beautiful water-colors of insects and flowers and showing how designs in three colors mathematically selected for harmony actually did produce color harmony in practice. His English had become difficult through long disuse, so he spoke to me in that clear, few-syllabled German which the true linguist can use so effectively. I had written a few unimportant articles in English on his color theory, and he authorized me to translate his 'Farbenfibel' into English; but no publisher could be found for 'The Color Primer' in the United States. This year a translation was at last brought out in England.

"Ostwald was terribly hurt by the damage to internationalism which the war occasioned, particularly to the internationalism of science and scientists. He felt this to have been an appalling disaster and a reflection on the intelligence of the human race."

INSTITUTE NOTES

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National Council

The ninety-seventh meeting of the council of The American Institute of Chemists was held at The Chemists' Club, 52 East 41st Street, New York, N. Y., on Thursday, December 15, 1932.

In the absence of President Henry G. Knight, Dr. M. L. Crossley presided. In the absence of Secretary Neiman, Mr. E. L. Gordy acted as secretary *pro tem*.

The following councilors and officers were present: Messrs. Arnstein, Breithut, Brooks, Crossley, Jackson, Kenney, Morgan, Rogers, Sachs.

A letter was read from William Post, F.A.I.C., making formal application for the granting of a charter to a new chapter of the Institute, to be called the Niagara Frontier Chapter. The application was accompanied by a tentative constitution and by-laws.

Upon motion made and seconded, it was decided to grant the application for a charter.

Upon motion made and seconded a committee was appointed to pass upon the proposed constitution and by-laws. Dr. Crossley appointed to this committee Messrs. Neiman, Van Doren, and Gordy. This committee was instructed to report at the next meeting of the Council.

A letter from Eugene F. Cayo, F.A.I.C., was presented raising the question of the position of the National Council in regard to utterances by chapters on questions of national policy. The Secretary was instructed to write a letter to Mr. Cayo informing him that there was no provision in the Constitution or By-Laws of The American Institute of Chemists restricting the utterances of the local chapters. It was the sense of the Council that any such restriction is unnecessary, provided

that such utterances are clearly in the name of the Chapter.

A letter from Mr. Samuel Cabot to Dr. D. D. Jackson, Chairman of the Membership Committee, was presented; and the Secretary was instructed to write a letter to Mr. Cabot advising him that the Council was glad to receive applications from chemists of long experience, whether they possessed six years of collegiate and post-graduate training or not; and that the Council therefore, upon recommendation of Dr. Jackson and other councilors present, specifically places itself on record as favoring the election of men like Mr. Cabot.

Thirty-two new members were elected.

Upon motion made and seconded, the Treasurer's report was accepted.

Upon motion made and seconded, the expenditure of $25 for Mr. D. H. Jackson's abstract of company literature for the advertising campaign was approved.

The Council discussed at length the report of the Secretary on the conference which he and Dr. Knight had with Mr. Buffum of the Chemical Foundation.

The editor's report on THE CHEMIST was also discussed at length.

Upon motion made and seconded, a committee was authorized to be appointed, to report promptly to the Council a definite plan for the future carrying on of THE CHEMIST. The chairman appointed Messrs. Neiman, Breithut, Sachs, Kenney, and Gordy.

EDWARD L. GORDY,
Secretary, *Pro tem*

New York Chapter

A joint meeting of the New York Chapter with the Society of Chemical Industry, the Société de Chimie Industrielle, the Electrochemical Society, and the New York Section of the American Chemical Society was held at the McGraw-Hill auditorium on Friday evening, December 16th, with Dr. D. D. Jackson, chairman of the New York Chapter of the A. I. C., presiding. The meeting was preceded by a dinner at The Chemists' Club.

A short talk was made on the relief drive of the Gibson Committee by Major J. J. Finley, and on the work of the Breyer Committee by George Hasslacher. The main address of the evening was delivered by Dr. Theodore Zucker, who spoke on "Vitamin Research and Public Health."

First outlining the history of vitamin research, Dr. Zucker described in detail the work on vitamin D, dwelling particularly on the process by which it was patented and put into commercial production by the National Oil Products Company under patents held by Columbia University Patents, Inc. Dr. Zucker also devoted a portion of his talk to the problems involved in making the vitamin D concentrate suitable for introduction into milk for the prevention of rickets in babies.

The talk was followed by lantern slides showing both the X-ray and stained-fibia method of assaying concentrates and inspecting the results.

The paper was discussed by Dr. Walter H. Eddy of Columbia University, who brought out the point that Dr. Zucker's talk would not reach the public and that scientists should make use of advertising in newspapers and magazines to point out the scientific merits of new chemical and medical advances. Utilization, he pointed out, is dependent upon telling the story to the masses; and scientists should see what they can do toward getting the right facts into advertising.

Commenting that standardization always brings quality down to the minimum, Dr. Eddy said that he wondered why New York cows give milk containing exactly 3.5% of butter fat, while Rhode Island cows give exactly 2.5%.

Inspection of vitamin content of milk will also have its difficulties, he said.

Dr. Herbert M. Evans of the Rockefeller Institute, discoverer of vitamin E, raised the point that perhaps the high vitamin D content of cod-liver oil is due to the plankton upon which the cod feeds.

Other comments were made by Dr. James Brown, F.A.I.C.

The complete text of Dr. Zucker's article will be published in a later issue of THE CHEMIST.

Pennsylvania Chapter

The January meeting was featured by a symposium on patents. Dr. Horace C. Porter opened the discussion with some general remarks on the importance of patents to pure as well as to applied science. He stressed the advisability of recording ideas, witnessed and dated, on the remote possibility that some day they might be patentable. Dr. Porter also mentioned some of the attractive features in Canadian patent law. There the patentee does not have complete control of his patent if it applies to food or medicine, and is thus prevented from charging excessive prices for such articles. He is required also to manufacture the article or product patented and to supply the reasonable requirements of the public. In drawing patents, the importance of exact definitions can hardly be overemphasized, and the inventor, unless he is a lawyer himself, should not draw his own specifications.

Following Dr. Porter, other phases of patent law and patent writing were taken up by Messrs. Alston B. Moulton, Thomas Ellis, and Charles W. Rivise, F.A.I.C., all of whom are patent attorneys. Mr. Moulton said that too often clients fail to appreciate the many factors to be considered in drawing up patents, and frequently withhold important information, even from their attorneys. He took up some of the details of patent writing, and also discussed some of the reasons why many patents are never used. The patentee must convince the public of the usefulness of the article he has patented and too often has neither the skill nor the capital to do this.

Mr. Ellis spoke of the duties of the chemist as an intermediary between his client or employer and the patent attorney, and stressed the importance of the development of confidence between the two. It is also imperative that the chemist be capable of making a thorough search in the literature to determine the status of the art.

Mr. Rivise, who is attached to the Patent Office, gave an amusing account of some strange patents which have been granted. Among these were an automatic hat tipper for gallant gentlemen encumbered with parcels, a device for fishing for tape worms in the stomach, a device to keep the feet warm with ones own breath, a device to mark eggs as they are laid, and a dog biscuit which looks like a bone. People sometimes rush too quickly to patent, losing a chance to make a patent broader by further researches. At the same time, too much delay is also to be avoided.

These interesting talks were followed by a lively discussion in which Messrs. Jones, Hocker, Neidig, Stericker, Tyson, and Cayo participated.

HOWARD STOERTZ, *Reporter*

Washington Chapter

The following are excerpts from a letter received from A. L. Mehring, chairman of the Washington Chapter:

". . . few coal analyses are made by the Bureau of Mines for agencies outside the government. They are made as a result of an appeal to the government to act as a referee in a dispute between commercial laboratories, and then only when both sides sign the request and agree to abide by the decision. The fee for this service is purposely higher than the usual commercial fee, in order to discourage the practice of appealing to the government. . . .

"The Bureau of Standards during the year ended June 30, 1932, made 145,789 determinations for the public and 680,377 determinations for the government. The determinations for the public are of four kinds, as follows:

(1) Cooperative research work where the government needs the information. No charge is made for such tests, and the results are published for the information of any one desiring it.
(2) Referee tests to settle disputes, which are made upon the written request of both parties to the dispute. In these cases, double the usual commercial fee is charged, in order to discourage the practice.
(3) When the article sent in is one about which the Federal Specification Board desires information, the test is made.
(4) When the test requested requires equipment available nowhere else in the United States, it is made and a suitable fee is charged.

"The Bureau of Standards has a printed list of all testing laboratories in the United States, showing the kind of equipment they possess. When a sample is received that does not fall into one of the above described classes, it is returned to the sender with the names of several commercial laboratories located near the sender. On an average, about 50 requests for analyses are refused per day. . . .

"At present, so far as I know, the Federal Government does not do work that competes with commercial chemists. The research and control work performed by the government chemists is of great value to the people of this country, and largely would not be done at all if not by the government. If, therefore, Congress should decide to abolish any of the chemical work of the government, in response to the concerted demands being made upon it, government chemists thus thrown out of work will have to compete for the commercial work available. Many of these men have world-wide reputations and would not have much trouble getting other employment, but this would cut down the number of positions for other chemists."

New Members

The following members were elected at the December 15th meeting of the National Council:

FELLOWS

GEORGE A. ABBOTT, *Professor*, University of North Dakota, Grand Forks, North Dakota.

LEMUEL M. AYCOCK, *Chemist*, Swann Chemical Co., 420 Lexington Avenue, New York, N. Y.

BARNARD BRONSON, *Professor*, N. Y.

State College for Teachers, Albany, N. Y.

SIDNEY MARSH CADWELL, *Director*, Tire Development Division, U. S. Rubber Co., 6600 E. Jefferson Ave., Detroit, Mich.

WILLIAM L. EVANS, *Chairman*, Department of Chemistry, Ohio State University, Columbus, Ohio.

IRVING FLAUMENHAFT, *President*, Lacquer and Chemical Corporation, 214 40th Street, Brooklyn, N. Y.

JAMES OTIS HANDY, *Consulting Chemist*, 50 East 41st Street, New York, N. Y.

RALPH HART, *Chemist*, Hart Products Co., 1440 Broadway, New York, N. Y.

J. WILLARD HERSHEY, *Teacher*, McPherson College, McPherson, Kansas.

ARTHUR W. HIXSON, *Professor of Chemical Engineering*, Columbia University, New York, N. Y.

JOHN PLATT HUBBELL, *Partner*, Singmaster and Breyer, 420 Lexington Avenue, New York, N. Y.

CARL IDDINGS, *In charge Research and Development*, The Muralo Company, 570 Richmond Terrace, Staten Island, N. Y.

ALEXANDER GEORGE KELLER, JR., *Assistant Director*, Graduate Hospital Laboratories, University of Pennsylvania, Philadelphia, Pa.

HARRY CONROD KOPKE, *Consulting Chemist*, 235 Dock Street, Philadelphia, Pa.

ROBERT EDWARD LYONS, *Professor and Head of Department*, Indiana University, Bloomington, Ind.

LEWIS H. MARKS, *Executive Secretary, Consultant*, Industrial Alcohol Institute, Inc., 420 Lexington Avenue, New York, N. Y.

ISADOR MILLER, *Chemist*, W. M. Grosvenor, 50 East 41st Street, New York, N. Y.

THOMAS JACKSON POTTS, *Chemist*, W. M. Grosvenor, 50 East 41st Street, New York, N. Y.

WILLIAM R. SHERIDAN, *Chief Chemist*, Dunlop Tire and Rubber Corporation, Sheridan Drive, Buffalo, N. Y.

ALEXANDER SILVERMAN, *Head*, Department of Chemistry, University of Pittsburgh, Pittsburgh, Pa.

NATHAN SULZBERGER, *Independent Research Chemist*, c/o Central Hanover Bank and Trust Co., 60th Street and 5th Avenue, New York, N. Y.

THOMAS GORDON THOMPSON, *Professor of Chemistry, Director*, Oceanographic Laboratories, University of Washington, Seattle, Wash.

ASSOCIATES

GARRETT DAVIS BUCKNER, *In charge of Animal Nutrition*, Kentucky Agricultural Experiment Station, Lexington, Ky.

THEODORE HASS GEIGER, *Chemist*, Pilot Chemical Corp., P. O. Box 96, Carlstadt, N. J.

DAVID B. HARDIN, *Assistant Professor*, North Carolina State College, Textile School, Raleigh, N. C.

JOSEPH M. QUISITO, *Physiological Chemist*, 62 Butler Street, Trenton, N. J.

STANLEY HARTSHORN WHITING, *Research Chemist*, Calco Chemical Co., Bound Brook, N. J.

FRANK W. WILDER, *Research Chemist*, Calco Chemical Co., Inc., Bound Brook, N. J.

JUNIORS

FRANK ELLIS ELDER, *Student*, College of the Pacific, Stockton, Calif.

JAMES EDWARD GILL, *Chemist*, Kerr Bleaching and Finishing Works, Concord, N. C.

ALFRED E. HARTMANN, *Research Chemist*, Robert Rauh, Inc., 480 Frelinghuysen Avenue, Newark, N. J.

JOHN FRANK LONTZ, *Graduate Assistant*, Temple University, Philadelphia, Pa.

Applications for Membership

FELLOWS

JOSEPH WILLIAMS AYERS, *Director of Research*, C. K. Williams & Company, 640 North Thirteenth Street, Easton, Pa.

EDW. H. BUCY, *Vice-President, Director of Research*, Brevolite Lacquer Company, North Chicago, Ill.

BESSIE E. BUTCHER, *Head*, Science Department, Eagle Rock High School, Los Angeles, Calif.

ROBERT CRAIG ERNST, *Associate Professor*, Speed Scientific School, University of Louisville, Louisville, Ky.

STUART KABNICK, *Chemical Research*, Pennsylvania Bio-chemical Laboratory, 1410 Spruce Street, Philadelphia, Pa.

WILLIAM A. SMITH, *Manager*, Gasoline and Oil Departments, Larkin Co., Inc., 680 Seneca Street, Buffalo, N. Y,

ASSOCIATES

WALTER ARTHUR DEW, *Assistant Director*, Burnside Laboratory, Smokeless Powder Dept., E. I. du Pont de Nemours and Co., Inc., Carney's Point, N. J.

DONALD MASON ROCKWELL, *Teacher*, Juniata College, Huntingdon, Pa.

JUNIOR

FRANKLIN H. BIVINS, *Vice-President*, Foster D. Snell, Inc., 130 Clinton Street, Brooklyn, N. Y.

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NEWS

Colin G. Fink, F.A.I.C., has been awarded three patents for electroplating tungsten, a feat long attempted but never before accomplished by a method suitable for commercial production.

The tungsten-plated materials have a smooth, hard, coherent coating which carries a high luster. It is not attacked by acids or aqueous alkalies and does not tarnish in the air.

S. C. Lind, director of the school of chemistry at the University of Minnesota, has been elected editor of the *Journal of Physical Chemistry*. Dr. Lind, in addition to his experience as a chemical executive, has been a member of the board of editors of the American Chemical Society and of the *Chemical Review*.

Reginald M. Banks has been appointed sales manager of the industrial chemical division of the American Cyanamid & Chemical Company.

Helps Graduates

In order to assist a number of Wisconsin Ph.D.'s in science who have been unable to find satisfactory employment, the Wisconsin Alumni Research Foundation has made a special grant of $10,000 to support a number of research associateships in pure science. The appointments are for one year, with the privilege of resigning at any time should a satisfactory position become available. The board of regents has cooperated by exempting the appointees from laboratory fees.

Suit by Foundation

The Chemical Foundation has filed a patent infringement suit against the General Aniline Works, formerly the Grasselli Dyestuffs Corporation. The bill of complaint alleges infringement of two patents for vat dyes and processes, which were granted June 16, 1915, to Richard Herz, of Frankfort-on-Main, Germany. These patents were seized on October 16, 1917, by the U. S. Alien Property Custodian and later were sold to the Chemical Foundation

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Government Research

Savings of hundreds of thousands of dollars a year have been effected and additional savings running into the tens of millions a year are being sought through research by the Department of Agriculture into the problems of the naval stores industry, Dr. Henry G. Knight, Chief of the Bureau of Chemistry and Soils, said in an address delivered through stations of the National Broadcasting Company.

The industry, with an annual production in normal times ranging around $50,000,000 to $60,000,000 and supporting 300,000 persons, is suffering a loss annually of about $10,000,000 through evaporation of turpentine from the raw gum of pine trees from which it is made, Dr. Knight said, and this is one of the major problems on which the Bureau is working. In the hope of cutting the loss, improvements are being made in the design of the containers into which the gum runs from the trees, and of the gutters leading to the containers.

New Journal

The American Institute of Physics, Inc., announces the publication of the *Journal of Chemical Physics*, which is to appear monthly beginning January 1, 1933, at an annual subscription rate of $10.00. *The Review of Scientific Instruments* is to be included in the price of the subscription.

The new journal will include discussions of thermodynamics, solutions, surface phenomena, catalysis, molecular structure, electric moments of molecules, photo-chemistry, and statistical mechanics in its application to the kinetics of chemical reaction.

Round Table Meetings

The series of round table discussions on subjects of current scientific interest will be continued by The American Institute of the City of New York at its headquarters in the Lincoln Building, 60 East 42nd Street, New York. The meetings will be conducted by noted men of science and will be opened to members of the Institute and their guests.

On January 25th, Dr. Robert Chambers of the department of biology of New York University will lead the discussion of "Recent Investigations on the Nature of the Living Cell." Dr. W. J. V. Osterhout of the Rockefeller Institute will be guest authority.

Professor S. Ralph Powers of Teachers College will again lead a discussion on February 9th. Mr. Waldemar M. Kaempffert, science editor of the *New York Times*, will be the guest authority on the subject of "Science Education."

Dr. Ellice McDonald, director of cancer research, University of Pennsylvania School of Medicine, will be in charge of the discussion on "Modern Biological and Medical Research" on February 24th. Professor Ernst Waldschmidt-Leitz, visiting professor of cancer research, University of Pennsylvania School of Medicine, and director of the Institute of Biochemistry, Technical High School, Prague, Czechoslovakia, will be the guest authority.

New Chemical Industry

"Nutritional science is building a new chemical industry," says a recent release from Dr. William H. Easton, of the firm of Sheldon, Morse, Hutchins, and Easton, technical marketing consultants.

"Thirty-nine distinct elements are now recognized as essential in the diet to insure perfect health. The amounts of certain of these elements (chiefly various minerals and vitamins) may be far below minimal requirements in the diet of the average person. Chemistry, acting upon this information, is working out methods of adding these elements to the diet, and there is reason to believe that the use of chemically prepared supplements to natural foods—or diet reinforcement—will soon be general."

Orville E. May, F.A.I.C., has been elected treasurer of the Chemical Society of Washington, local section of the A.C.S.

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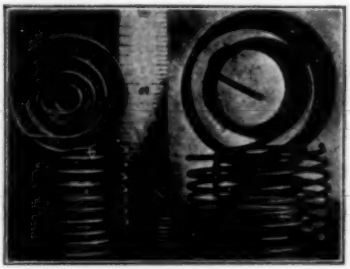

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